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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,185	11/20/1998	MYUNG-KEO HUR	06192.0052	8847

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EXAMINER

QI, ZHI QIANG

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 12/05/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/196,185

Applicant(s)

HUR ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears in the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-3,6-13 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4,5 and 14-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,043,859 (Maeda) and in view of JP 8-254680.

Claim 4, Maeda discloses (col.4, lines 20-23) that the metal film (data wire or gate wire) made of molybdenum or molybdenum alloy.

Although Maeda does not expressly disclose using the supplementary layer, but Maeda discloses (col.6, lines 5-34) that to assure contact reliability, the nitride film having superior corrosion resistance is used, and the function of the nitride film is the superior corrosion resistance to attain a good protection for the data line and the gate line, and the data wire (102) is located under the nitride film (14, in Fig.6).

The supplementary layer located either on or under the entire wire layer means increasing the film thickness, so as to block infiltration of external moisture.(i.e., to make more protection.)

JP 8-254680 also discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines

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(scanning lines and signal lines) made of molybdenum (Mo), and have the second supplementary layer, and such metal layers have a good protection to prevent the external influence. (it also discloses to endure the chemical influence.)

The supplementary layer is located either on or under the entire wire, that is to increase the thickness of the metal wire, so as to improve the corrosion resistance, so that decreasing the wire disconnection.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use supplementary layer which is the molybdenum nitride or molybdenum alloy nitride film located on or under the entire wire as claimed in claim 4 for improving the corrosion resistance and decreasing the wire disconnection .

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda and JP 8-254680 as applied to claim 4 above, and further in view of US 6,011,277 (Yamazaki).

Claim 5, Yamazaki discloses (col.14, lines 7-30) that a two-layer electrode (gate wire or data wire), lower chromium layer and upper metallic layer, and the metallic layer is a molybdenum layer, a wolfram (tungsten) layer, etc.

Maeda also discloses (col.6, lines 5-34) that tungsten, chromium, etc, are high melting point metal having superior corrosion resistance, so as to assure the contact reliability.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use the supplementary layer comprises one selected from the group consisting of tungsten, chromium, zirconium and nickel as claimed in claim 5 for good contact reliability.

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4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art, in view of US 9,043,859 (Maeda) and JP 8-254680.

Claim 14, Applicant admitted prior art (col.1, lines 11-22) indicated that in general, an LCD has:

- a substrate (insulating substrate, e.g., glass);
- a gate wire formed on the substrate;
- a gate insulating layer covering the gate wire;
- a data wire formed on the gate insulating layer;
- a passivation layer formed on the data wire;
- an ITO pixel electrode formed on the passivation layer and connected to the data wire (the drain electrode) through the contact hole.

Applicant admitted prior art does not expressly disclose the data wire is made of either molybdenum or molybdenum alloy, and a supplementary data wire is located either on or under the entire data wire and made of either molybdenum nitride or molybdenum alloy nitride.

However, Maeda discloses (col.4, lines 20-23 and col.6, lines 5-34) that the metal wire is made of molybdenum or molybdenum alloy, and to assure contact reliability, the nitride film having superior corrosion resistance is used, and the data wire (102) is located under the nitride film (14, in Fig. 6), and that supplementary nitride film is located on or under the entire data wire means increasing the film thickness, so as to block infiltration of external moisture. (i.e., to make more protection.)

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JP 8-254680 also discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (scanning lines and signal lines) made of molybdenum (Mo), and have the second supplementary layer, and such metal layers have a good protection to endure the chemical influence.

The supplementary layer is located either on or under the metal wire, that is to increase the thickness of the metal wire, so as to improve the corrosion resistance and decreasing the wire disconnection.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use the data wire such as the molybdenum or molybdenum alloy and supplementary data wire located on or under the entire data wire as claimed in claim 14 for improving the corrosion resistance and decreasing the wire disconnection.

5. Claims 15-17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art, Maeda and JP 8-254680 as applied to claim 14 above, and further in view of Yamazaki.

Claim 15 and 17, Yamazaki discloses (col.14, lines 7-30) that a two-layer electrode (gate wire or data wire), lower chromium layer and upper metallic layer, and the metallic layer is a molybdenum layer, a wolfram (tungsten) layer, etc.

Maeda also discloses (col.6, lines 5-34) that tungsten, chromium, etc. are high melting point metal having superior corrosion resistance, so as to assure the contact reliability.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use the supplementary layer comprises one selected from the group consisting of

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tungsten, chromium, zirconium and nickel as claimed in claims 15 and 17 for achieving high corrosion resistance.

Claim 16, see the detailed explanation of Maeda and JP 8-254680 above.

Response to Arguments

6. Applicant's arguments filed on Aug.27, 2001 have been fully considered but they are not persuasive.

Applicant's **only** arguments are as follows:

(1)The reference Maeda is to enhance the reliability of the pad/external connection area, the Application is to enhance the data and gate wires protection during etching process.

(2) The references JP 8-254680 and Yamazaki can not be combined to show the Application obvious.

Examiner's responses to Applicant's **only** arguments are as follows:

(1) Maeda discloses (col.6, lines 5-34) that to assure contact reliability, the nitride film having superior corrosion resistance is used, and the function of the nitride film is the superior corrosion resistance to attain a good protection for the data line and the gate line, and the data wire (102) is located under the nitride film (14, in Fig.6). Such that, Maeda discloses that using nitride to assure contact reliability, that means to enhance the wire protection.

(2) JP 8-254680 also discloses (col.3, line 42 - col.4, line 17 and Fig.2) that the metal lines (scanning lines and signal lines) made of molybdenum (Mo), and have the second

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supplementary layer, and such metal layers have a good protection to endure the chemical influence.

Yamazaki discloses (col.14, lines 7-30) that a two-layer electrode (gate wire or data wire), lower chromium layer and upper metallic layer, and the metallic layer is a molybdenum layer, a wolfram (tungsten) layer, etc.

The supplementary layer is located either on or under the metal wire, that is to increase the thickness of the metal wire, so as to improve the corrosion resistance and decreasing the wire disconnection.

Therefore, the limitations written in the claims would have been obvious as the explanation above over the prior art of record.

Conclusion

7. All claims are drawn to the same invention claimed in the parent application prior to the filing of this Continued Prosecution Application under 37 CFR 1.53(d) and could have been finally rejected on the grounds and art of record in the next Office action. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing under 37 CFR 1.53(d). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**


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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
November 29, 2001


William L. Sikes
Supervisory Patent Examiner
Technology Center 2800